UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/852,376	05/10/2001	Eric A. Jacobsen	884.427US1	5426

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EXAMINER
LY, ANH VU H

ART UNIT	PAPER NUMBER
2616	

DATE MAILED: 05/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/852,376	JACOBSEN, ERIC A.
	Examiner	Art Unit	
	Anh-Vu H. Ly	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>23 February 2006</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☒ Claim(s) *1-18 and 25-29* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All　b)☐ Some * c)☐ None of:

　　　1.☐ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
　　Paper No(s)/Mail Date _____.
4)☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set forth in

37 CFR 1.17(e), was filed in this application after final rejection. Since this application is

eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e)

has been timely paid, the finality of the previous Office action has been withdrawn pursuant to

37 CFR 1.114. Applicant's submission filed on February 23, 2006 has been entered.

Claim Objections

2.   Claims 1-18 and 25-29 objected to because of the following informalities:

With respect to claim 1, in line 1, the recitation "for performing" is not a positive

limitation but only requires the ability to so perform. Therefore, it does not limit a claim to a

particular structure and does not limit the scope of a claim or claim limitation.

With respect to claim 7, in lines 3, 5, 7, and 10, the recitation "for receiving", "for

extracting", "for acquiring", or "for performing" is not a positive limitation but only requires the

ability to so perform. Therefore, it does not limit a claim to a particular structure and does not

limit the scope of a claim or claim limitation.

With respect to claim 8, in line 2, the recitation "for performing" or "for calculating" is

not a positive limitation but only requires the ability to so perform. Therefore, it does not limit a

claim to a particular structure and does not limit the scope of a claim or claim limitation.

With respect to claim 9, in lines 2, 4, and 5, the recitation "for acquiring" or "for

calculating" is not a positive limitation but only requires the ability to so perform. Therefore, it

does not limit a claim to a particular structure and does not limit the scope of a claim or claim limitation.

With respect to claim 14, in lines 2-3, the recitation "for acquiring" or "for selectively retrieving" is not a positive limitation but only requires the ability to so perform. Therefore, it does not limit a claim to a particular structure and does not limit the scope of a claim or claim limitation.

With respect to claims 15-16, in line 2, the recitation "for extracting" is not a positive limitation but only requires the ability to so perform. Therefore, it does not limit a claim to a particular structure and does not limit the scope of a claim or claim limitation.

With respect to claim 17, in line 2, the recitation "for acquiring" or "for performing" is not a positive limitation but only requires the ability to so perform. Therefore, it does not limit a claim to a particular structure and does not limit the scope of a claim or claim limitation.

With respect to claim 18, in line 2, the recitation "for processing" is not a positive limitation but only requires the ability to so perform. Therefore, it does not limit a claim to a particular structure and does not limit the scope of a claim or claim limitation.

With respect to claim 25, in line 2, the recitation "for implementing" is not a positive limitation but only requires the ability to so perform. Therefore, it does not limit a claim to a particular structure and does not limit the scope of a claim or claim limitation.

Other pending claims are automatically objected to as they depend upon objected independent claims 1, 7, and 25.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3.   Claims 1-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Kadous (US

2001/0036235 A1).

With respect to claims 1, 7, 8, 19, and 25, Kadous discloses a method for performing

channel estimation within a communication system implementing OFDM (Fig. 5) comprising:

receiving an OFDM symbol from a communication channel (Fig. 1, received signal r(t)),

said OFDM symbol having a plurality of data subcarriers and a plurality of pilot symbols (It

should be understood that in an OFDM system, a signal r(t) comprises a plurality of data

symbols modulated by different subcarriers and a plurality of pilot symbols);

identifying subcarriers of interest, wherein the subcarriers of interest are a subset of the

plurality of data subcarriers (page 3, 32nd paragraph and Fig. 2, the channel estimate decoupler

58 then decouples the LS channel estimate for each channel received over a separate antenna if

more than one transmitting antenna is being used, i.e., over each of a plurality of antennas.

Herein, particular interested subcarriers are identified);

generating a pilot vector using pilot symbols from said OFDM symbol (page 3, 32nd paragraph and Fig. 2, the least square (LS) channel estimate is then determined by performing division on the training sequence in LS estimator 56);

obtaining a first interpolation vector corresponding to a first subscarrier of interest from a plurality of stored interpolation vectors (page 5, 68th paragraph, the coefficient interpolator and channel estimator 60 then would use these coefficients to interpolate the LS channel estimate. It is also to be noted that the same coefficients are to be used every burst, so the coefficient interpolator and channel estimator need not to calculate NXN matrix every burst. This implies that these coefficients must be stored and retrieved every time it needs to multiply with LS channel estimate); and

calculating a dot product of said pilot vector and said first interpolation vector to generate an equalization coefficient for said first subcarrier of interest (page 5, 75th paragraph, a complex matrix-vector multiplication is performed by multiplying the LS channel estimates and interpolating coefficients to estimate each channel).

With respect to claim 2, 9, 17, 24, and 29, Kadous discloses obtaining an interpolation vector corresponding to each subcarrier of interest (Fig. 3); and calculating a dot product of pilot vector and interpolation vector for each subcarrier of interest to generate an equalization coefficient for each subcarrier of interest (page 5, 75th paragraph, a complex matrix-vector multiplication is performed by multiplying the LS channel estimates and interpolating coefficients to estimate each channel).

With respect to claims 3, 16, 21, and 27, Kadous discloses generating a pilot vector includes selecting a set of pilot symbols from OFDM symbol based upon the identities of said subcarriers of interest (page 3, 32nd paragraph and Fig. 2, that the least square (LS) channel estimate is then determined by performing division on the training sequence in LS estimator 56. The channel estimate decoupler 58 then decouples the LS channel estimate for each channel received over a separate antenna if more than one transmitting antenna is being used, i.e., over each of a plurality of antennas.).

With respect to claims 4, 15, and 22, Kadous discloses generating a pilot vector includes using all pilot symbols within OFDM symbol (page 3, 32nd paragraph and Fig. 2, that the least square (LS) channel estimate is then determined by performing division on the training sequence in LS estimator 56).

With respect to claims 5, 14, 18, 23, and 28, Kadous discloses obtaining a first interpolation vector includes selectively retrieving first interpolation vector from a memory (page 5, 68th paragraph, the coefficient interpolator and channel estimator 60 then would use these coefficients to interpolate the LS channel estimate. It is also to be noted that the same coefficients are to be used every burst, so the coefficient interpolator and channel estimator need not to calculate NXN matrix every burst. This implies that these coefficients must be stored and retrieved every time it needs to multiply with LS channel estimate);

With respect to claims 6, 10, 20, and 26, Kadous discloses identifying subcarriers of

interest includes identifying subcarriers associated with a first user within the communication

system (page 3, 32nd paragraph and Fig. 2, the channel estimate decoupler 58 then decouples the

LS channel estimate for each channel received over a separate antenna if more than one

transmitting antenna is being used, i.e., over each of a plurality of antennas. Herein, particular

interested subcarriers are identified).

With respect to claims 11-13, Kadous discloses that communication device is a portable

communicator, a base station, or a wireless OFDM transceiver (Fig. 1).

Response to Arguments

4.   Applicant's arguments filed February 23, 2006 have been fully considered but they are

not persuasive.

Applicant argues in page 8 that Kadous does not disclose receiving an OFDM symbol

from a communication channel, said OFDM symbol having a plurality of data subcarriers and a

plurality of pilot symbols, and identifying subcarriers of interest, wherein the subcarriers of

interest are a subset of the plurality of data subcarriers. Examiner respectively disagrees. First

of all, Kadous discloses in Fig. 1, a receiver for estimating channels in OFDM communication

systems by receiving an inputted signal r(t). It is known in OFDM system, data is modulated by

a plurality of subcarriers and the first subcarrier in each group of subcarriers among a plurality of

groups contains a pilot symbol. Further, Kadous discloses that the channel estimate decoupler 58

then decouples the LS channel estimate for each channel received over a separate antenna if

more than one transmitting antenna is being used, i.e., over each of a plurality of antennas.

Herein, particular interested subcarriers are identified (page 3, 32nd paragraph).

Applicant further argues in page 9 that Kadous does not disclose obtaining a first

interpolation vector corresponding to a first subcarrier of interest from a plurality of stored

interpolation vectors. Examiner respectfully disagrees. Kadous discloses that the coefficient

interpolator and channel estimator 60 then would use these coefficients to interpolate the LS

channel estimate. It is also to be noted that the same coefficients are to be used every burst, so

the coefficient interpolator and channel estimator need not to calculate NXN matrix every burst.

This implies that these coefficients must be stored and retrieved every time it needs to multiply

with LS channel estimate for each interested channel or interested subcarrier (page 5, 68th
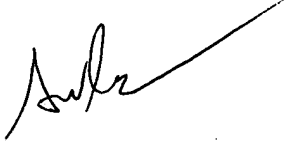
paragraph).

Conclusion

5.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Anh-Vu H. Ly whose telephone number is 571-272-3175. The

examiner can normally be reached on Monday-Friday 7:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chi Pham can be reached on 571-272-3179. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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